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Honorable Commissioner of  
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Box **PATENT APPLICATION**  
Washington, D.C. 20231

Re: New Patent Application  
Bates et al. - RO998-222

Dear Sir:

We enclose herewith the application of Bates et al. for Letters Patent for METHOD AND COMPUTER PROGRAM PRODUCT FOR IDENTIFYING HYPERTEXT LINKS IN DOCUMENT PRINTOUTS (Case RO998-222), including the specification, a set of 16 claims and one copy of the drawings (5 sheets). Also enclosed is the Declaration with Power of Attorney and an Assignment to INTERNATIONAL BUSINESS MACHINES CORPORATION.

We have calculated the filing fee as follows:

Basic fee	\$760.00
Additional filing fees:	
0 claims in excess of 20, times \$18	0.00
3 independent claims, minus 3,	
times \$78	0.00
Assignment Recordal Fee	<u>40.00</u>
	\$800.00

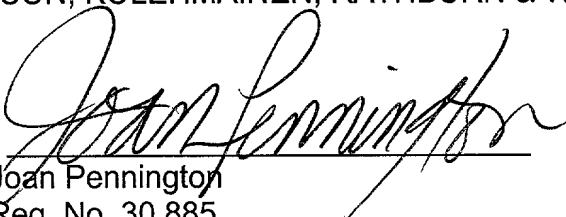
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Page 2  
Case No. RO998-222

Please charge the filing fee and assignment recordal fee in the amount of \$800.00 to Deposit account No. 09-0465 of International Business Machines Corporation.

The Commissioner of Patents and Trademarks is hereby authorized to charge any deficiency or credit any overpayment in the above fees to the deposit account No. 09-0465 of International Business Machines Corporation. A duplicate copy of this letter is enclosed.

Respectfully submitted,

MASON, KOLEHMAINEN, RATHBURN & WYSS

By:   
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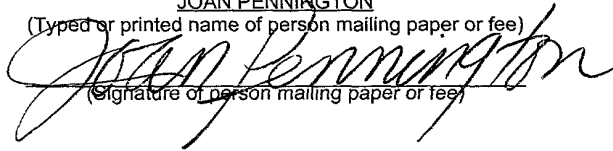
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-1-

**METHOD AND COMPUTER PROGRAM PRODUCT FOR IDENTIFYING  
HYPERTEXT LINKS IN DOCUMENT PRINTOUTS**

**Field of the Invention**

5           The present invention relates generally to the data processing field,  
and more particularly, relates to a method, apparatus and computer program  
product for identifying hypertext links in document printouts.

**Description of the Related Art**

10           On a WEB document printout, generally no information about the  
hypertext links is available within the text of the printed document. Web  
documents are designed for browsing or reading on line. When reading a  
web based document on line, a user uses a mouse to click on the hypertext  
links or references to see the linked information. A mechanism is needed for  
15           identifying hypertext links in document printouts. As used in the following  
description and claims, a local or internal hypertext reference means  
hypertext pointing to a section of the current document that is within the  
same uniform resource locator (URL). As used in the following description  
and claims, an external hypertext reference means hypertext pointing to  
another uniform resource locator (URL).

**Summary of the Invention**

20           A principal object of the present invention is to provide a method,  
apparatus, and computer program product for identifying hypertext links in  
document printouts. Other important objects of the present invention are to

RO998-222

provide such method, apparatus and computer program product for identifying hypertext links in document printouts substantially without negative effect and that overcome many of the disadvantages of prior art arrangements.

5           In brief, a method, apparatus and computer program product are provided for identifying hypertext links in document printouts. A document to be printed is scanned for identifying local hypertext links within the document. A page location of each identified local hypertext link within the document is computed and stored. Printable objects are sequentially  
10       checked to identify each printable object within a hypertext anchor tag. Each identified printable object within a hypertext anchor tag is rendered with a predefined indication of the hypertext link.

          In accordance with features of the invention, a local hypertext link is printed with a page number of the hypertext link within the document. An  
15       external hypertext link is printed with a uniform resource locator (URL) for the external hypertext link. The page number of the hypertext link within the document and the uniform resource locator (URL) for the external hypertext link can be printed, for example, in superscript form and bolded or with other highlighting.

## 20       **Brief Description of the Drawings**

          The present invention together with the above and other objects and advantages may best be understood from the following detailed description of the preferred embodiments of the invention illustrated in the drawings, wherein:

25           FIGS. 1A and 1B are block diagram representations illustrating a computer system and operating system for implementing a method and computer program product for identifying hypertext links in document printouts in accordance with the invention;

30           FIG. 2 is a chart illustrating a document data structure of the preferred embodiment;

FIGS. 3 and 4 are flow charts illustrating exemplary steps for implementing document printing and identifying hypertext links in document printouts in accordance with the preferred embodiment; and

5 FIG. 5 is a block diagram illustrating a computer program product in accordance with the preferred embodiment.

### Detailed Description of the Preferred Embodiments

Having reference now to the drawings, in FIGS. 1A and 1B, there is shown a computer or data processing system generally designated by the reference character 100 for carrying out the document printing method for identification of hypertext references of the preferred embodiment. As shown  
10 in FIG. 1, computer system 100 includes a central processor unit (CPU) 102, a read only memory 103, a random access memory 104, a display adapter 106 coupled to a display 108. CPU 102 is connected to a user interface (UI) adapter 110 connected to a pointer device and keyboard 112. CPU 102 is  
15 connected to an input/output (IO) adapter 114 connected to a direct access storage device (DASD) 116 and a tape unit 118. CPU 102 is connected to a communications adapter 120 providing a communications function. It should be understood that the present invention is not limited to a computer model with a single CPU, or other single component architectures as shown in FIG.  
20 1.

As shown in FIG. 1B, computer system 100 includes an operating system 130 and a hypertext link identification printing program 132 of the preferred embodiment. In accordance with features of the invention, a document printout provides identification of local and external hypertext links  
25 or references. A table of document data 200 is stored for identifying local hypertext links in a document printout of the preferred embodiment.

Various commercially available computers can be used for computer system 100, for example, an IBM personal computer. CPU 102 is suitably programmed by the hypertext link identification printing program 132 to  
30 execute the flowcharts of FIGS. 3 and 4.

In accordance with features of the invention, hypertext links are easily

identified when printing documents. For a local or internal hypertext reference with hypertext pointing to a section of the document that is within the same URL (an internal reference), the page number is calculated and inserted into the document printout. The internal hypertext reference text or hot text may be bolded or highlighted in various ways, and the page number is inserted in superscript or in parenthesis or the like. For example, an internal hypertext reference text may be printed as shown in the following Table 1:

Table 1

Roof shingles should be attached with **shingle nails** (page 15)

where "shingle nails" is the internal hypertext reference text to another portion of this document and the "page 15" is inserted at print time as a superscript, generated by the print function based on the current printer selected and the current font settings, margins, etc. that control the pagination for a given printout. It should be understood that the superscript may further describe where on page 15 where the referenced text appears, such as, to a paragraph number or to a line number.

In accordance with features of the invention, for an external hypertext reference with the hypertext pointing to a URL address external to the current document, the URL address is inserted into the printout, for example, in a superscript or other font at the point in the text where the hypertext appears or as a footnote with a footnote reference in the text. For example, an external hypertext reference text may be printed as shown in the following Table 2:

Table 2

You should frame art in quality **picture frames**([http://www.Picture\\_Frames\\_Catalogue.com](http://www.Picture_Frames_Catalogue.com))

where "picture frames" is hypertext to an external URL and the URL is printed as enclosed in parenthesis and in superscript. The reader is alerted that "picture frames" is hypertext to an external URL, and is also given the URL.

Instead of superscript, footnotes can be used to document a particular external URL. Footnotes containing the URL addresses can appear either at page bottom or grouped together on a separate page. With the URL addresses printed, the user can note the URL and then logon to the Internet to navigate to the given addresses if desired. For example, a group of external hypertext references may be printed in a footnote as shown in the following Table 3:

Table 3

**picture frames<sup>1</sup>**

**art<sup>2</sup>**

\* \* \*

footnotes:

<sup>1</sup>([http://www.Picture\\_Frames\\_Catalogue.com](http://www.Picture_Frames_Catalogue.com))

<sup>2</sup>([http://www.Art\\_Gallery\\_Catalogue.com](http://www.Art_Gallery_Catalogue.com))

Referring now to FIG. 2, document data 200 of the preferred embodiment is illustrated. The document data 200 is a table containing each local anchor name 202 from the <a name="???> tag together with a page number 204 identified in a particular document to be printed. A print routine of the preferred embodiment, illustrated and described with respect to FIG. 4, first scans the particular document to be printed and determines the page on which all such anchor tags 202 appear. Then the local anchor names 202 and page number 204 are stored in document data 200. When printing the document, when a <a href="???> is found, the page number for a local hypertext reference is retrieved from document data 200 and printed, for example, as shown in Table 1. When an external hypertext reference is found, such as <a href="???>PRINTABLE DATA</a> tag, the URL is printed, for example as a superscript after the printable data, such as shown in Table 2, where picture frames is the printable data and the URL is ([http://www.Picture\\_Frames\\_Catalogue.com](http://www.Picture_Frames_Catalogue.com)), or as shown in Table 3, where the URL is shown as a footnote.

Referring now to FIGS. 3 and 4, exemplary steps are shown for implementing document printing including the identification of hypertext links in document printouts in accordance with the preferred embodiment. In FIG. 3, a main browser flow routine is shown starting at a block 300. An event is

obtained as indicated in block 302. Checking whether the event is a print event is performed as indicated in a decision block 304. When a print event is identified, a routine is performed to print the current document with hypertext link annotation as indicated in block 308. The document printing routine of the preferred embodiment is shown in FIG. 4. Otherwise, when the event is not a print event, all other browser events are handled in the normal way.

Referring now to FIG. 4, exemplary steps of the print routine of the preferred embodiment are shown starting at a block 400. First as indicated in block 402, the document is scanned, computing a page location of all <a name="???"> tags in the document and the computed page number 204 for each local hypertext link is stored with the name 202 in the document data. Then sequential operations start with a first printable object as indicated in block 404. A printable object is defined such that only one printable object can be included within an anchor tag. Checking for more printable objects is performed as indicated in a decision block 406. When another printable object is identified, checking whether the printable object is within an anchor tag is performed as indicated in a decision block 410. When the printable object is not within an anchor tag, then the printable object is rendered in the normal fashion as indicated in block 412. If true that the printable object is within an anchor tag, then checking for a local hypertext reference is performed as indicated in a decision block 414. When a local hypertext reference is not identified, then checking for an external hypertext reference is performed as indicated in a decision block 416. When an external hypertext reference is identified, then the printable object is rendered in normal fashion as indicated in block 418. Then the URL for the external hypertext reference is rendered, for example, in superscript or footnote form and may be printed bold or with other highlighting, as indicated in block 420. When a local hypertext reference is identified at block 414, then the printable object is rendered in normal fashion as indicated in block 422. Then the name for the local hypertext reference is found in the document data and a page number is printed, for example, in superscript or footnote form as indicated in block 424.

Referring now to FIG. 5, an article of manufacture or a computer program product 500 of the invention is illustrated. The computer program



product 500 includes a recording medium 502, such as, a floppy disk, a high capacity read only memory in the form of an optically read compact disk or CD-ROM, a tape, a transmission type media such as a digital or analog communications link, or a similar computer program product. Recording  
5 medium 502 stores program means 504, 506, 508, 510 on the medium 502 for carrying out the methods for implementing document printing to identify hypertext links in document printouts of the preferred embodiment in the system 100 of FIGS. 1A and 1B.

10 A sequence of program instructions or a logical assembly of one or more interrelated modules defined by the recorded program means 504, 506, 508, 510, direct the computer system 100 for implementing document printing and identifying hypertext links in document printouts of the preferred embodiment.

15 While the present invention has been described with reference to the details of the embodiments of the invention shown in the drawing, these details are not intended to limit the scope of the invention as claimed in the appended claims.

## Claims

What is claimed is:

1           1.     A computer implemented method for identifying hypertext links  
2     in document printouts comprising the steps of:  
3           scanning a document to be printed and identifying local hypertext links  
4     within the document,  
5           computing and storing a page location of each identified local  
6     hypertext link within the document,  
7           sequentially checking printable objects to identify each printable object  
8     within a hypertext anchor tag; and  
9           rendering each identified printable object within said hypertext anchor  
10    tag with a predefined indication of the hypertext link.

1           2.     The computer implemented method for identifying hypertext  
2     links in document printouts as recited in claim 1 wherein the step of  
3     rendering each identified printable within said hypertext anchor tag with said  
4     predefined indication of the hypertext link includes the steps of checking  
5     whether said identified printable object within said hypertext anchor tag is a  
6     local hypertext link.

1           3.     The computer implemented method for identifying hypertext  
2     links in document printouts as recited in claim 2 responsive to identifying said  
3     local hypertext link, printing said identified page number for local hypertext  
4     link said with said printable object.

1           4.     The computer implemented method for identifying hypertext  
2     links in document printouts as recited in claim 3 wherein the step of printing  
3     said identified page number for local hypertext link with said printable object  
4     includes the step of printing said identified page number in superscript form.

1           5.     The computer implemented method for identifying hypertext  
2     links in document printouts as recited in claim 3 wherein the step of printing  
3     said identified page number for local hypertext link with said printable object  
4     includes the step of printing said identified page number in bold form.

1           6.     The computer implemented method for identifying hypertext  
2 links in document printouts as recited in claim 1 wherein the step of  
3 rendering each identified printable within said hypertext anchor tag with said  
4 predefined indication of the hypertext link includes the steps of checking  
5 whether said identified printable object within said hypertext anchor tag is an  
6 external hypertext link.

1           7.     The computer implemented method for identifying hypertext  
2 links in document printouts as recited in claim 6 responsive to identifying said  
3 external hypertext link, printing a uniform resource locator (URL) for said  
4 external hypertext link said with said printable object.

1           8.     The computer implemented method for identifying hypertext  
2 links in document printouts as recited in claim 7 wherein the step of printing  
3 said uniform resource locator (URL) for said external hypertext link said with  
4 said printable object includes the step of printing said uniform resource  
5 locator (URL) in superscript form.

1           9.     The computer implemented method for identifying hypertext  
2 links in document printouts as recited in claim 7 wherein the step of printing  
3 said uniform resource locator (URL) for said external hypertext link said with  
4 said printable object includes the step of printing said uniform resource  
5 locator (URL) in footnote form.

1           10.    Apparatus for identifying hypertext links in document printouts ✓  
2 comprising:  
3           a stored document data, said document data including each local  
4 hypertext link name and a page number for each said local hypertext link  
5 name; and  
6           a printing program utilizing said stored document data for printing a  
7 document including a predefined indication of each hypertext link within the  
8 document to be printed.

1           11.    Apparatus for identifying hypertext links in document printouts  
2 as recited in claim 10 wherein said predefined indication of each hypertext  
3 link within the document to be printed includes a corresponding uniform  
4 resource locator (URL) printed for each external hypertext link.

1           12. Apparatus for identifying hypertext links in document printouts  
2 as recited in claim 10 wherein said predefined indication of each hypertext  
3 link within the document to be printed includes a corresponding page number  
4 printed for each local hypertext link.

1           13. A computer program product for implementing document     ✓  
2 printing including identification of hypertext links comprising:  
3 a recording medium;  
4 means, recorded on the recording medium, for sequentially checking  
5 printable objects to identify each printable object within a hypertext anchor  
6 tag; and  
7 means, recorded on the recording medium, for rendering each  
8 identified printable within said hypertext anchor tag with a predefined  
9 indication of the hypertext link.

1           14. A computer program product for implementing document  
2 printing including identification of hypertext links as recited in claim 13  
3 includes means, recorded on the recording medium, for scanning a  
4 document to be printed and for identifying local hypertext links within the  
5 document, and means, recorded on the recording medium, for computing  
6 and storing a page location of each identified local hypertext link within the  
7 document.

1           15. A computer program product for implementing document  
2 printing including identification of hypertext links as recited in claim 13  
3 wherein said means, recorded on the recording medium, for rendering each  
4 identified printable object within said hypertext anchor tag with a predefined  
5 indication of the hypertext link includes means, recorded on the recording  
6 medium, for printing a corresponding uniform resource locator (URL) for  
7 each external hypertext link.

1           16. A computer program product for implementing document  
2 printing including identification of hypertext links as recited in claim 14  
3 wherein said means, recorded on the recording medium, for rendering each  
4 identified printable object within said hypertext anchor tag with a predefined  
5 indication of the hypertext link includes means, recorded on the recording  
6 medium, for printing said page number for each local hypertext link.

665740-44426260

## METHOD AND COMPUTER PROGRAM PRODUCT FOR IDENTIFYING HYPERTEXT LINKS IN DOCUMENT PRINTOUTS

### Abstract of the Disclosure

5 A method, apparatus and computer program product are provided for  
identifying hypertext links in document printouts. A document to be printed is  
scanned for identifying local hypertext links within the document. A page  
location of each identified local hypertext links within the document is  
computed and stored. Printable objects are sequentially checked to identify  
10 each printable object within a hypertext anchor tag. Each identified printable  
object within a hypertext anchor tag is rendered with a predefined indication  
of the hypertext link. A local hypertext link is printed with a page number of  
the hypertext link within the document. An external hypertext link is printed  
with a uniform resource locator (URL) for the external hypertext link. Both  
15 the page number of the local hypertext link within the document and the  
uniform resource locator (URL) for the external hypertext link can be printed,  
for example, in superscript form and bolded or with other highlighting.

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**FIG. 1A**

HYPertext REFERENCE IDENTIFICATION PRINTING PROGRAM 132	DOCUMENT DATA 200
OPERATING SYSTEM 130	

FIG. 1B

DOCUMENT DATA 200	
LOCAL ANCHOR NAME 202	PAGE NUMBER 204
ABC	20
A1	5

FIG. 2

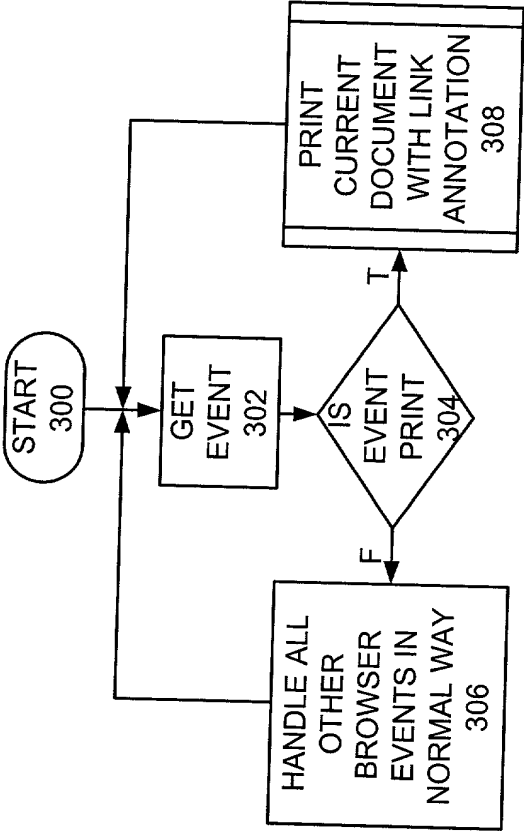


FIG.3



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**FIG.4**

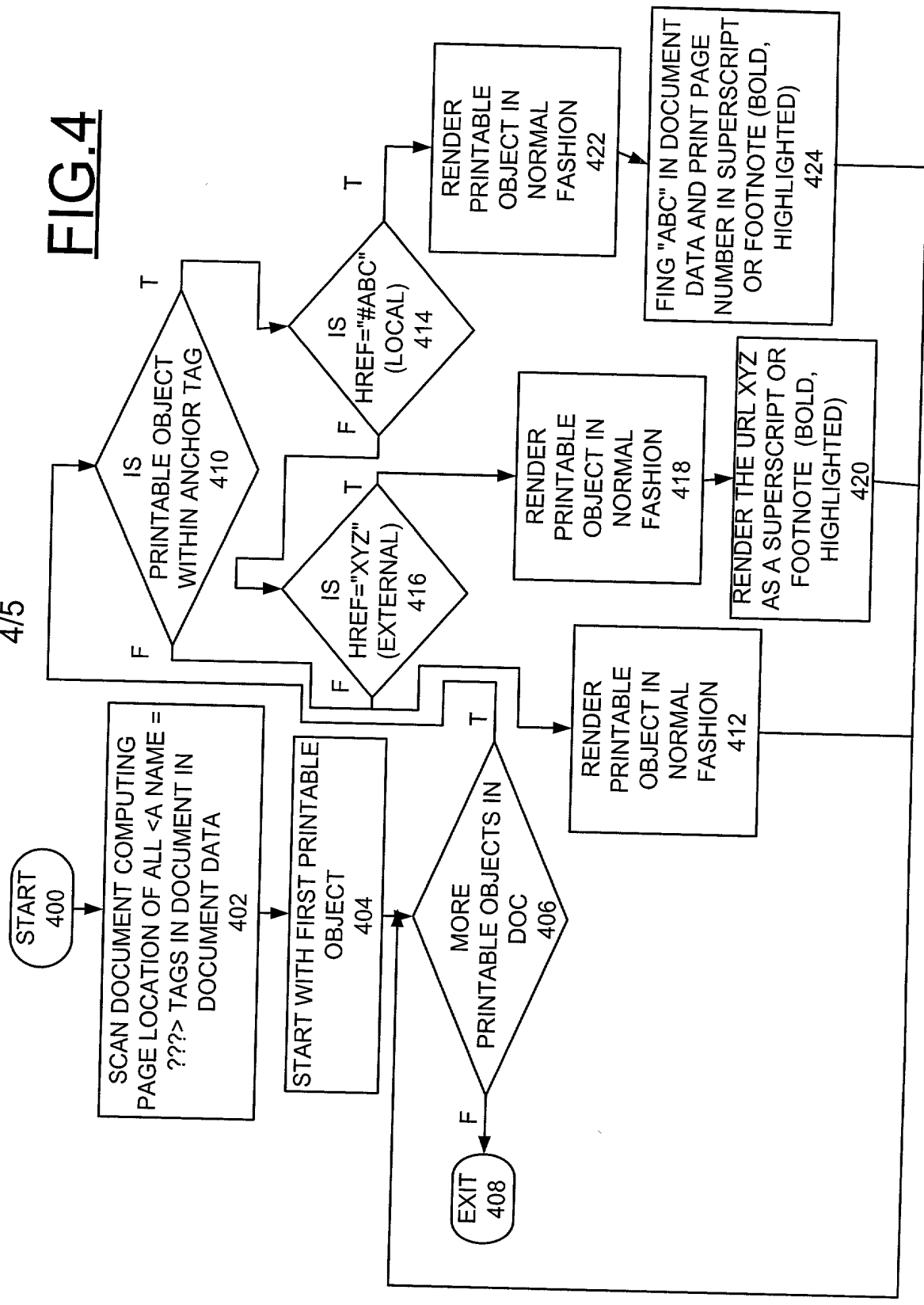
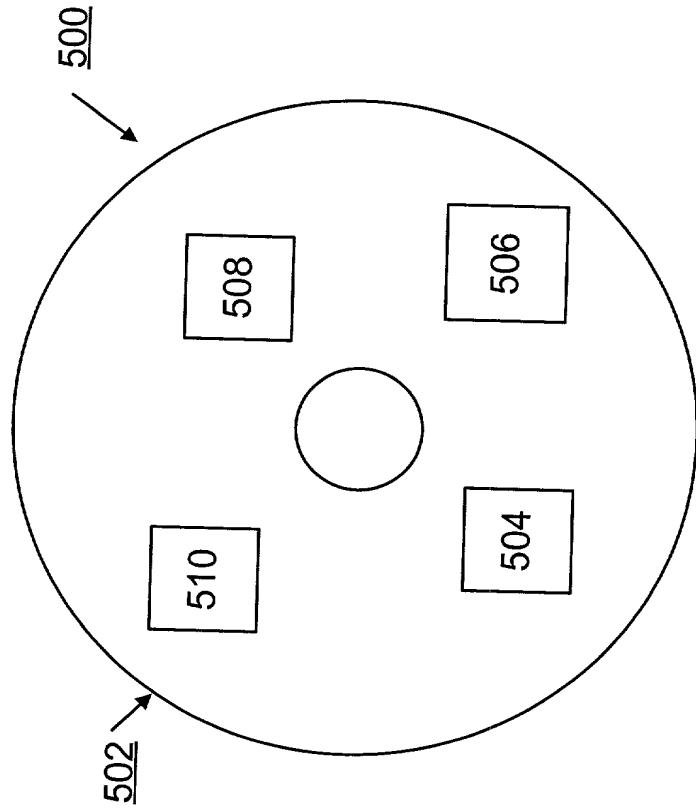


FIG. 5



## DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

### METHOD AND COMPUTER PROGRAM PRODUCT FOR IDENTIFYING HYPERTEXT LINKS IN DOCUMENT PRINTOUTS

the specification of which (check one)

☒ is attached hereto.

☐ was filed on \_\_\_\_\_ as

Application Serial No. \_\_\_\_\_

and was amended on \_\_\_\_\_  
(if applicable)

☒ I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

☒ I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulation, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

(NONE) \_\_\_\_\_ YES NO  
(Number) (Country) (Day/Month/Year Filed)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States Application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the

\_\_\_\_\_ This declaration ends with this page. X Signature for 2nd and subsequent inventors. # pages added 2

prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT International filing date of this application:

(NONE)  
 (Application Serial No.) (Filing Date) (Status) (Patented, Pending, Abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

(List name and registration number)

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4-14-99

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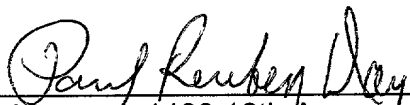
Citizenship: United States of America  
 Post Office Address: same as above

---

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Inventor's signature

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